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FOSSIL LOCALITIES OF THE SUNSET HIGHWAY AREA, OREGON

By
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Introduction

The Sunset Highway area in western Columbia and Washington counties, Oregon, is famous for its abundant marine fossils of Oligocene age. This fossiliferous area lies about 35 miles northwest of Portland and extends from Mist at the north end to Gaston at the south. Outcrops yielding fossils are numerous, and almost every exposure of sedimentary rock that is hard enough to have resisted weathering reveals at least a few fossils. The 12 localities described on the following pages, and shown with corresponding numbers on the accompanying map, are easily reached by road. Sunset Highway (US 26) bisects the area and surfaced roads lead north and south from it.

Geologic Setting

During most of the period from late Eocene until the end of Oligocene time, some 30 to 50 million years ago, northwest Oregon was covered by an arm of the sea in which molluscs and other marine invertebrates were exceedingly numerous. Streams eroding the adjacent lands brought in mud, sand, and volcanic ash which settled in layers on the floor of the sea, and as the floor gradually subsided, thousands of feet of sediments accumulated. Shells of the animals living on the sea bottom or washed up along the margins were thus buried and preserved as fossils in the sedimentary rocks.

Some time after the close of the Oligocene period, the land was uplifted permanently from the sea and the sedimentary rocks were warped into gentle folds and then deeply eroded. Today these tilted fossil-bearing strata are exposed in steep banks along streams and in road cuts and quarries.

The oldest fossiliferous sediments in the area belong to the Cowlitz formation (upper Eocene), which in the region of the Cowlitz River, Washington, reaches a thickness of nearly 8,000 feet. In Oregon, the Cowlitz formation is less extensive and consists largely of conglomerates and sandstones that were deposited near the shore of the Eocene sea. These rocks crop out irregularly along the western side of the Sunset Highway area, where they overlie older volcanic rocks of the Coast Range. Some outcrops of the Cowlitz formation contain marine shells (Locality 5) and others show fossil plant remains.

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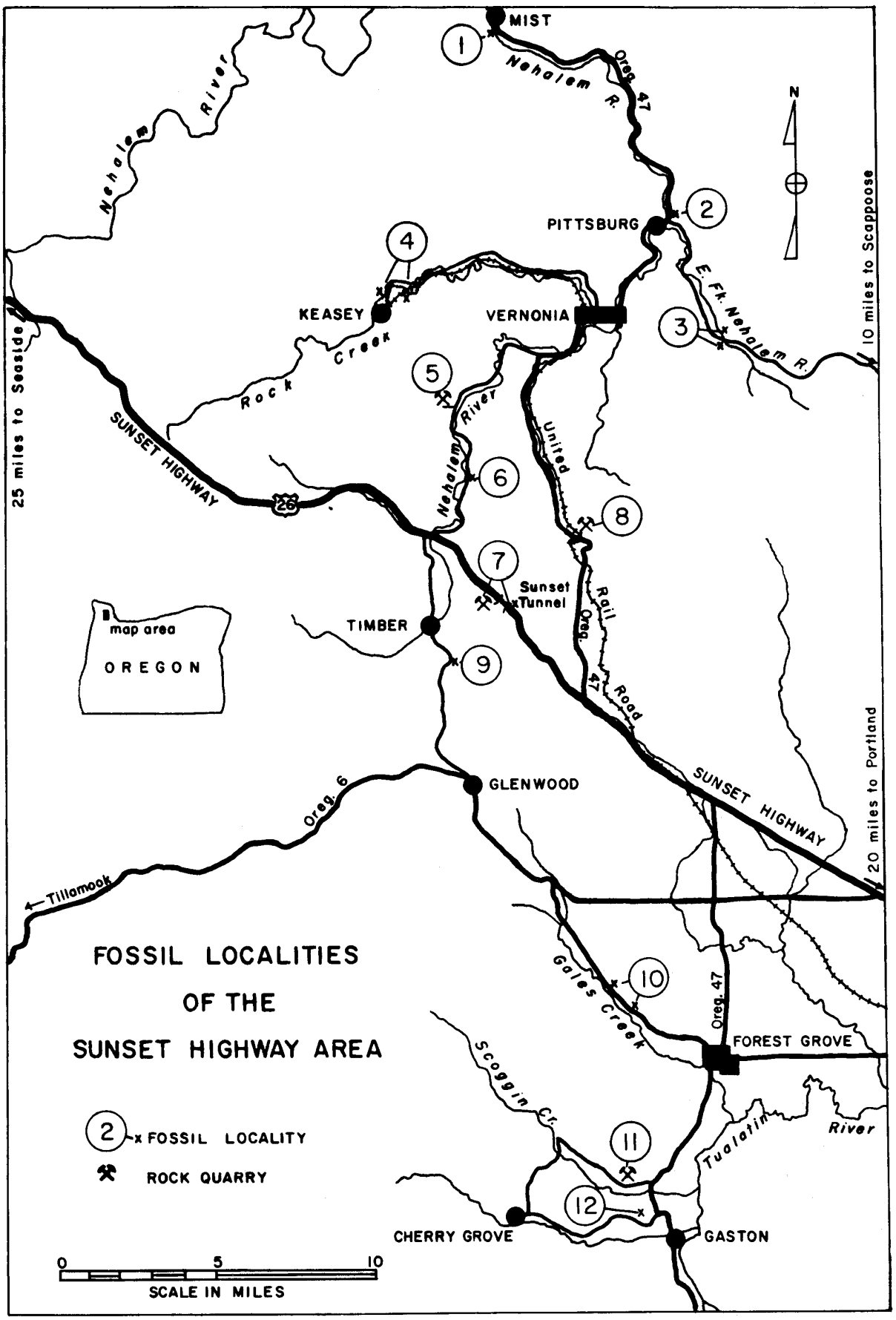

MIST
Nehalem River
Oreg. 47
Nehalem R.
N
PITTSBURG
E. Fk. Nehalem R.
10 miles to Scappoose
KEASEY
VERNONIA
Rock Creek
25 miles to Seaside
SUNSET HIGHWAY
26
Nehalem River
United
map area
OREGON
TIMBER
Sunset Tunnel
Rail
Oreg. 47
Road
SUNSET HIGHWAY
GLENWOOD
Oreg. 6
Tillamook
20 miles to Portland
FOSSIL LOCALITIES
OF THE
SUNSET HIGHWAY AREA
Gales Creek
Oreg. 47
FOREST GROVE
Scoggin Cr.
Tualatin River
x FOSSIL LOCALITY
ROCK QUARRY
CHERRY GROVE
GASTON
0
5
10
SCALE IN MILES

Overlying the Eocene sediments are the highly fossiliferous Oligocene marine formations. Most noteworthy of these, as far as abundance of fossils is concerned, are the Keasey and Pittsburg Bluff formations (named after Keasey and Pittsburg in Columbia County where the formations were first studied). The Keasey formation, which is the older of the two, is about 2,000 feet thick. It is, for the most part, a massive tuffaceous siltstone which is gray on fresh exposure but turns soft and yellowish when exposed to the weather. It crops out between Keasey and Vernonia, and continues in a wide band trending north and south through the center of the map area. Fossils are numerous in most unweathered outcrops (Localities 1, 4, 6, 7, 8, 9, 10) and include many new species that are yet to be described.

The Pittsburg Bluff formation is a massive sandstone about 800 feet thick containing beds that are richly fossiliferous. It is exposed in various places from the bluffs along the Nehalem River north of Pittsburg to outcrops along Sunset Highway east of the tunnel. It is most fossiliferous in the vicinity of Pittsburg (Localities 2 and 3) where the fossils are typical of a near-shore or shallow-water fauna. Layers of plant remains, carbonaceous material, and coal are characteristic of the Pittsburg Bluff formation. Farther south, near Gaston, a fossiliferous basaltic sandstone believed to be of similar age crops out in several places (Localities 11 and 12).

Both the Keasey and the Pittsburg Bluff formations contain hard limy concretions ranging from the size of a baseball to 3 or more feet in diameter. These concretions are difficult to break open, but are usually worth the trouble as most have something of interest inside, such as the carapace of a crab or some beautifully preserved shells.

Fossil Localities

1. Mist crinoid locality

An unusual crinoid zone in the Keasey formation is located in a high bluff on the west side of the Nehalem River 0.3 mile south of the junction of Oregon highways 47 and 202 in Mist. The outcrop is plainly visible from Highway 47. To reach it, cross the Nehalem River on the Burn Road bridge just south of Mist and walk upstream several hundred feet along the west bank of the river to the bluff and then a short distance along the base of the bluff at the water's edge. The whole bluff is composed of gray fine-grained tuffaceous siltstone of the Keasey formation. Since the crinoid zone is only a few feet above the river at low-water stage, it can be reached only in late summer.

Crinoids, popularly known as sea lilies, resemble plants but are actually marine animals of the echinoderm family. Fossil crinoids of Tertiary age have been found in only a few places in the world, and nearly complete specimens, including stem, cup, and branching arms, such as occur at the Mist locality, are especially rare. Consequently, this remarkable deposit should be treated with respect, and care taken not to cause unnecessary destruction of the bed. Other fossils found with the crinoids include spiny echinoderms (sea urchins) and various molluscs.

2. Pittsburg locality

The sandstone bluffs along the Nehalem River near the town of Pittsburg in Columbia County are the type locality for the Pittsburg Bluff formation of Oligocene age. The formation is well exposed a short distance north of Pittsburg in road cuts along State Highway 47, especially at 0.2 mile north of the Scappoose road junction. At this location the massive sandstone contains narrow bands thickly crowded with gastropods.

3. East Fork of Nehalem River locality

A richly fossiliferous zone about 20 feet thick in the Pittsburg Bluff formation crops out on both sides of the East Fork of the Nehalem River valley, and is reached via the highway that connects Oregon 47 and Scappoose. Most of the fossils are in hard concretionary masses and some are so well preserved that even the mother-of-pearl is still present.

The locality is near the highway bridge that crosses the East Fork of the Nehalem River 5 miles southeast of Oregon State Highway 47 (or 16 miles northwest of Scappoose). One outcrop is near a power line about 30 feet above the highway on the steep hillside at the west end of the bridge. The same fossil bed crops out at about the same elevation, but much more extensively, along an abandoned railroad on the opposite side (north) of the valley. This latter outcrop is about $\frac{1}{4}$ mile northwest of the highway bridge and above a small ranch on the highway. To reach it, start from the east end of the highway bridge and walk northwest across a wooded pasture to the west end of the first railroad trestle. Climb up to the railroad bed, about 30 feet, and continue west a short distance along the old railroad grade to a second trestle. Cross this trestle. The fossil bed is continuously exposed for several hundred feet west of the second trestle and many excellent fossils can be collected here.

4. Rock Creek locality

The original collecting area for Keasey fossils, the type locality for the Keasey formation of Oligocene age, is in the banks of Rock Creek between Vernonia and Keasey. The locality is largely of historical interest today because the Keasey formation is now exposed elsewhere in less weathered and more accessible places.

A road and a railroad follow up Rock Creek, crossing it a number of times between Vernonia and the Keasey railroad station. A large suite of fossils is reported from the steep, high bank at the south end of the fourth railroad bridge. To reach this locality from Vernonia, start at the intersection of State Avenue and Oregon 47. Follow State Avenue toward Keasey for 8 miles to the point where the second highway bridge and the third railroad bridge are side-by-side and about 20 feet apart. From here, follow the railroad on foot southwest around curve to the next (fourth) railroad bridge, a distance of about $\frac{1}{4}$ mile.

Fossils also occur near water level in the low bank of Rock Creek at the north end of the third highway bridge, 8.8 miles from Vernonia (or 0.8 mile east of Keasey railroad station).

5. Rocky Point quarry locality

The locality is at a small basalt quarry west of the Nehalem River and on the west side of the Timber-Vernonia road (surfaced). It is 5.8 miles via this road north of Sunset Highway (or 4.7 miles south of the junction with Oregon 47). At this mileage there is a Longview Tree Farm sign on the east side of the road. Opposite is a private road which leads west about 1/8 mile to the quarry. Basalt is exposed at the base of the quarry, but overlying the basalt is about 15 feet of basal conglomerate of the Cowlitz formation containing many Eocene marine fossils. These include numerous pelecypods and an occasional shark tooth.

6. Nehalem River locality

A fossiliferous outcrop of the Keasey formation occurs in a prominent cut along the Nehalem River on the east side of the road from Timber to Vernonia, 3.0 miles north of the junction with Sunset Highway. The locality is about 3 miles south of Locality 5. Large pelecypods of the genus Thyasira are found at this outcrop.

7. Sunset Tunnel locality

Sunset Tunnel is a well-known landmark on Sunset Highway. For a few years after this highway was constructed, fossils were abundant in the prominent road cuts in shale beds for about 2 miles at either end of the tunnel. Now, however, weathering has caused the soft shales to disintegrate and most of the road cuts are seeded to grass. In a few places, harder beds are still exposed, particularly at the east end of the tunnel. At the opposite end of the tunnel (west end), Keasey shale is freshly exposed in the Empire Lite-Rock quarry, and many well-preserved fossils can be found here. Permission to hunt for fossils should be obtained at the quarry.

8. Railroad trestle locality

An abundantly fossiliferous zone in the Keasey formation is exposed in the cliffs at both ends of a high-curving railroad trestle which crosses Oregon State Highway 47 between Sunset Highway and Vernonia. The trestle is 6.2 miles north of Sunset Highway and about $8\frac{1}{2}$ miles south of Vernonia. There is a parking space beside the highway at the base of this trestle. To reach the fossil localities at either end of the trestle climb a steep foot trail to the railroad bed above and continue along the tracks for a short distance. Many well-preserved fossil shells of Oligocene age may be collected from outcrops along the railroad. Fossil crinoids have been discovered at both ends of the trestle.

About $\frac{1}{4}$ mile beyond the north end of the trestle and adjacent to the railroad is the Smithwick Haydite quarry in which Keasey shale is freshly exposed and fossils are unweathered. Permission should be obtained to hunt for fossils in the quarry.

9. Timber locality

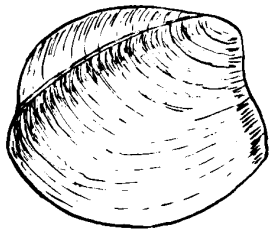
The Keasey formation crops out in a prominent cut at a sharp bend in the Timber-Glenwood road (surfaced). The locality is 1.3 miles south of the railroad crossing in Timber, or 5.2 miles north of Glenwood. Fossil shells in this outcrop are well preserved.

10. Gales Creek locality

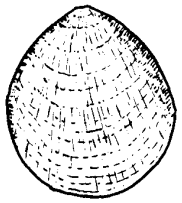
The Keasey formation crops out in two road cuts on Oregon State Highway 6 on the north side of Gales Creek valley, west of Forest Grove. The first road cut is $3\frac{1}{2}$ miles west of the center of Forest Grove, and the second cut is 1.2 miles beyond the first. Although weathered, both outcrops still preserve a few Oligocene fossil shells in the harder sandstone layers. Concretions are numerous and some when broken open reveal fossil crabs.

11. Scoggin quarry locality

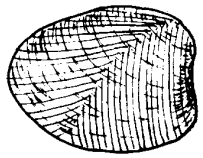
A massive basaltic sandstone containing fossils of Oligocene age crops out in an old quarry on the north side of Scoggin Creek road. To reach the quarry go 5 miles south from



THYASIRA



GLYCYMERIS

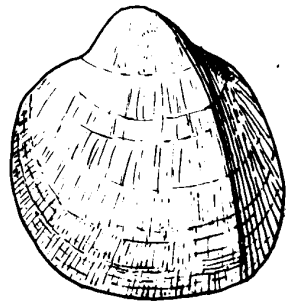


ACILA

SOLEN

DELECTOPECTEN

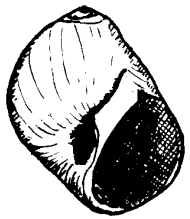
NUCULANA



NEMOCARDIUM

EPITONIUM

EXILIA



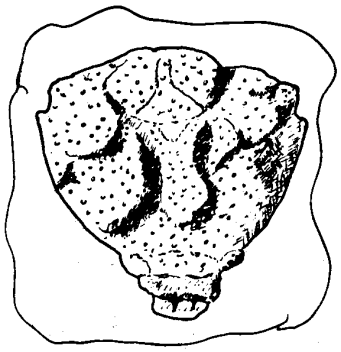
POLINICES

BRUCLARKIA

MOLOPOPHORUS

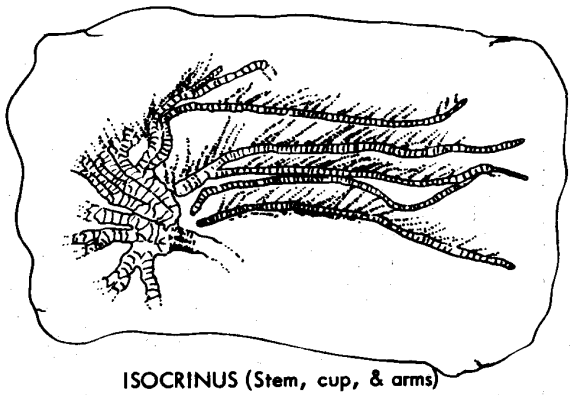
CANCELLARIA

DENTALIUM



ZANTHOPSIS (Carapace)

SHARK TOOTH



ISOCRINUS (Stem, cup, & arms)

SOME TYPICAL FOSSILS OF THE SUNSET HIGHWAY AREA, OREGON
(Approximate natural size)

Forest Grove on Oregon 47 (or 2 miles north from Gaston) to Scoggin Creek road; turn west and go 1.0 mile. The quarry is right beside the road. Fossils are extremely numerous and well preserved, but difficult to remove from the hard rock. A triangular mollusk called Pachydesma gastonensis is especially plentiful at this site.

12. Cherry Grove road locality

A hard sandstone ledge containing fossils of Oligocene age crops out in the open hillside on the north side of the Cherry Grove road. To reach the outcrop, go 6 miles south from Forest Grove via Oregon 47 (or 1 mile north from Gaston) to the Cherry Grove road; turn west and go 1.0 mile. The sandstone ledge, which has been quarried in the past is visible from the road and is about a hundred feet above it. Fossil shells are abundant and well preserved, though difficult to extract from the hard rock.

Fossils to Look For

Hundreds of species of fossil shells have been collected from the Sunset Highway area and identified by paleontologists, and there are many new fossil species that have never been described. A few of the fossils typical of the area are illustrated on the opposite page. Molluscs, chiefly pelecypods (clams) and gastropods (snails), make up the majority of the large fauna, but other types of marine fossils such as shark teeth, crabs, and crinoids (sea lilies) are also represented Plant remains in the form of woody material and poorly preserved leaves are locally present. Names of some of the fossils commonly found in the Cowlitz, Keasey, and Pittsburg Bluff formations, together with those less common but of special interest, are listed below. For a more complete list of species see the references cited at the end of this report.

Cowlitz formation (upper Eocene)

Pelecypods:
- Acila decisa (Conrad)
- Glycymeris eocenica (Weaver)
- Ostrea griesensis Effinger
- Volsella cowlitzensis (Weaver and Palmer)

Gastropods:
- Exilia dickersoni (Weaver)
- Ficopsis cowlitzensis (Weaver)
- Polinices nuciformis (Gabb)
- Siphonalia sopenahensis (Weaver)

Plant remains

Shark teeth

Keasey formation (lower Oligocene)

Pelecypods:
- Acila nehalemensis Hanna
- Delectopecten (new species)
- Nemocardium weaveri (Anderson and Martin)
- Nuculana (new species)
- Thyasira disjuncta (Gabb)
- Yoldia chehalisensis (Arnold)

Gastropods:
- Cancellaria (new species)
- Epitonium keaseyense Durham
- Exilia lincolnensis Weaver
- Gemmula bentsonae Durham
- Polinices (new species)
- Scaphander stewarti Durham

Keasey formation (lower Oligocene) cont.

Scaphopods (Dentalia)

Crinoids:
- Isocrinus oregonensis Moore and Vokes
- Isocrinus nehalemensis Moore and Vokes

Echinoderms (sea urchins)

Crustacea (crabs):
- Zanthopsis vulgaris Rathbun
- Eumorphocorystes naselensis Rathbun

Pittsburg Bluff formation (middle Oligocene)

Pelecypods:
- Acila shumardi (Dall)
- Nuculana washingtonensis (Weaver)
- Macrocallista pittsburgensis (Dall)
- Spisula pittsburgensis Clark
- Solen townsendensis Clark
- Tellina pittsburgensis Clark
- Thracia condoni Dall

Gastropods:
- Bruclarkia columbiana (Anderson and Martin)
- Molopophorous gabbi Dall
- Perse pittsburgensis Durham
- Polinices washingtonensis (Weaver)

Plant remains

Selected Bibliography

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Rathbun, Mary J., 1926, The fossil stalk-eyed crustacea of the Pacific slope of North America: U.S. National Museum Bull. 138. (Fossil crabs illustrated)

Schenck, Hubert G., 1928, Stratigraphic relations of western Oregon Oligocene formations: Calif. Univ. Dept. Geol. Sci. Bull., v. 18, no. 1.

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Warren, W. C., Norbisrath, Hans, and Grivetti, R. M., 1945, Geology of northwestern Oregon west of the Willamette River and north of latitude 45° 15': U.S. Geol. Survey Oil and Gas Invest. Prelim Map 42, with text. (Includes many additional fossil localities and lists names of fossils)

Weaver, Charles E., 1942, Paleontology of the marine Tertiary formations of Oregon and Washington, Parts 1, 2, and 3: Wash. Univ. Pub. in Geol., v. 5. (Contains pictures and descriptions of most of typical fossils of the Sunset Tunnel area)

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NEW OIL AND GAS PERMIT ISSUED

Permit No. 25 was issued to Sunray Mid-Continent Oil Company - Lloyd Corporation, May 10, for a test drilling in northwestern Multnomah County. According to the permit the drilling is to be in the NW¼ sec. 12, T. 2 N., R. 2 W. The test is to be made on land leased from Ralph and Helen Kappler, Mulino, Oregon, and is to be known as the Kappler No. 1 well.

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ASSESSMENT TIME NEARS

The current assessment year ends at noon on July 1, 1957. By that time a total of $100 worth of work and improvements must be done on all unpatented mining claims in the State if they are to remain in good standing. Within thirty days after completion of the work a proof of labor must be filed in the county courthouse for the county in which the claim is located. Law publishing firms stock these forms which provide for the following necessary information: (1) name of claim or claims and book and page where original location notice is recorded; (2) number of days' work done and kind and value of improvements made, together with their location; (3) dates of performing labor and making improvements; (4) at whose instance or request work was done; and (5) amount paid for labor and improvements and by whom paid when same was not done by claim owner.

The Department has published a bulletin, Mining Laws of the State of Oregon, which contains state and federal regulations pertaining to both quartz and placer claims. Copies of the bulletin may be obtained from Department offices in Portland, Baker, and Grants Pass at a cost of 50 cents.

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OREGON HAS NEW DREDGE MINING LAW

House Bill 655 was passed by the Senate May 10 and only awaits the Governor's signature to become law. The bill, which would require a permit, a bond, and establish certain practices for dredging operations, was introduced by Representative Steward (Keating) and Senators Hopkins (Imbler) and Musa (The Dalles). After one public hearing and several amendments, the Legislature passed the bill - something that practically every Legislature in the past had refused to do when confronted with similar measures. In order to introduce mining interests to Oregon's new law, the important parts of the bill are given below. Ed.

A BILL FOR AN ACT

Relating to mining operations; appropriating money; and prescribing penalties.

Be It Enacted by the People of the State of Oregon:

Section 1. As used in this Act:

(1) "Board" means the State Land Board.

(2) "Consulting committee" means the committee established by section 10 of this Act.

(3) "Dredging operation" means any dredge mining operation, except industrial mineral or sand and gravel production, conducted in this state which substantially disturbs more than 15 acres per year of the topsoil or ground cover of the land on which it is conducted, if the land so disturbed constitutes the floor of a valley.

Section 2. (1) No person shall conduct a dredging operation without securing a license from the board as provided in this Act. . . . If the applicant is not the owner of the lands described in the application, the owner thereof shall indorse his approval on the application. The application shall be accompanied by an application fee of $50 for each 50 acres of land, or fraction thereof, covered by the application. The fees received shall be deposited in the General Fund to the credit of a special account, hereby established; and such fees are continuously appropriated for the prupose of this Act.

(2) A majority of the consulting committee shall conduct a field examination of the land covered by the application and at its discretion may require the applicant to file with the board a surety bond not to exceed the sum of $300 for each acre of land, or fraction thereof, covered by the application. . . .The bond shall run in favor of the State of Oregon and shall be conditioned upon the faithful performance by the applicant of all the requirements imposed by the board within the limits of the provisions of this Act. . . .

Section 3. (1) The board shall issue a license to any applicant complying with the requirements of section 2 of this Act. The license shall contain where possible an accurate legal description of the land on which the dredging operation is to be conducted and shall specify the number of acres thereof. The license shall be conditioned upon the licensee's doing all things which in the opinion of the board are necessary to restore the land on which the dredging operation is to be conducted as nearly as practicable or desirable for future use. At the discretion of the board, the license may be conditioned upon the licensee's:

(a) Replacing the topsoil and ground cover disturbed in the course of the dredging operation and restoring the area involved in the dredging operation to its reasonably useful condition.

(b) Replacing any stream disturbed in the course of the dredging operation and with a pool structure conducive to good fish habitat and recreational use.

(c) Constructing settling ponds of sufficient capacity and character to remove silt caused by the dredging operation before the water is discharged into a stream.

(2) The license, unless terminated as provided in section 4 of this Act, shall permit dredging operations upon the lands described therein beginning on the date of the license.

Section 4. (1) The board may revoke any license for any violation of the provisions of this Act or the conditions of the license. No license shall be revoked until after a hearing on the alleged violation is held by the board or its examiner. . . .The board shall make findings based on the evidence introduced at the hearing, and shall revoke the license if violations of the provisions of this Act or the conditions of the license are found.

(2) In revoking the license, the board may declare forfeited so much of the bond or cash deposit as may be necessary for the restoration of lands and streams damaged by the dredging operation, not to exceed $300 per acre of land to be restored. The amount so forfeited shall be applied by the board to the restoration of the lands and streams in accordance with the conditions specified in the license.

Section 5. (Provides for an appeal to the circuit court.)

Section 6. The board shall make periodic inspections of dredging operations to determine whether this Act is being complied with.

Section 7. (Charges circuit courts to restrain any operation which violates section 2.)

Section 8. The board may make necessary rules and regulations to carry out the provisions of this Act.

Section 9. . . . .The issuance of a license under section 3 of this Act shall not relieve any licensee of any obligation imposed upon him by other law.

Section 10. (1) A consulting committee hereby is established. The committee shall be composed of the State Game Director, the Director of the Department of Geology and Mineral Industries, the Director of Agriculture and the Clerk of the State Land Board, who shall serve as the committee chairman. In addition to the foregoing members, when a field examination of the land covered by an application is conducted under section 2 of this Act, the members of the county court or board of county commissioners of the county or counties in which such land is located shall also be members of the consulting committee.

(2) The consulting committee shall convene at the call of its chairman for the purpose of performing its duties under this Act.

Section 11. Any person conducting a dredging operation in violation of the provisions of this Act is guilty of a misdemeanor.

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